READY-TO-USE BLEACHING COMPOSITIONS, PREPARATION PROCESS AND BLEACHING PROCESS

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See application file for complete search history.

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ABSTRACT

A composition comprising:

i) at least one anhydrous bleaching composition in paste form comprising

at least one peroxycatuated salt,

at least one alkaline agent, and

from 15% to 35% by weight of at least one inert organic liquid, and

ii) at least one oxidizing composition in the form of a hydrogen peroxide oil-in-water emulsion comprising

at least one surfactant chosen from nonionic and anionic surfactants and

at least one copolymer comprising at least one hydrophobic unit and at least one unit derived from at least one ethylenically unsaturated monomer comprising at least one sulphonate group, in free or partially or totally neutralized form.

The composition may, for example, be used for bleaching human keratin fibers, such as hair.

Also disclosed is a process for preparing a ready-to-use composition, comprising mixing, before use, the bleaching composition with the oxidizing composition.

64 Claims, No Drawings
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Thus, disclosed herein is a composition for bleaching human keratin fibers, such as the hair, which can be obtained by mixing before use comprising:

i) at least one anhydrous bleaching composition comprising at least one peroxygenned salt, at least one alkaline agent, and from 15% to 35% by weight of at least one inert organic liquid, and

ii) at least one oxidizing composition comprising at least one surfactant chosen from nonionic and anionic surfactants and at least one copolymer comprising at least hydrophobic unit and at least one unit derived from at least one ethylenically unsaturated monomer comprising at least one sulphonic group, in free or partially or totally neutralized form.

In one embodiment, the at least one anhydrous bleaching composition is in paste form.

In one embodiment, the at least one oxidizing composition is in the form of a hydrogen peroxide oil-in-water emulsion.

Further disclosed herein is a process for preparing the composition, comprising mixing before use at least one anhydrous bleaching composition, in paste form, and with the at least one oxidizing composition.

Even further disclosed herein is a process for bleaching human keratin fibers, such as hair, comprising applying the at least one ready-to-use bleaching composition, as disclosed herein, to the area of wet or dry human keratin fibers to be bleached; leaving the at least one ready-to-use composition to act for a leave-in time that is sufficient to obtain the desired bleaching; removing the at least one ready-to-use composition from the human keratin fibers by rinsing with water, washing the human keratin fibers with shampoo, and optionally drying the human keratin fibers.

Also disclosed herein is a multi-compartment device, or “kit”, for performing the abovementioned bleaching process, comprising at least two compartments, wherein at least one compartment comprises at least one anhydrous bleaching composition comprising at least one peroxygenned salt, at least one alkaline agent, and from 15% to 35% by weight of at least one inert organic liquid, and at least one oxidizing composition comprising at least one surfactant chosen from nonionic and anionic surfactants and at least one copolymer comprising at least one hydrophobic unit and at least one unit derived from at least one ethylenically unsaturated monomer comprising at least one sulphonic group, in free or partially or totally neutralized form and comprising at least one hydrophobic unit.

In one embodiment, the at least one anhydrous bleaching composition is in paste form.

In one embodiment, the at least one oxidizing composition is in the form of a hydrogen peroxide oil-in-water emulsion.

It has been found that some embodiments of mixtures of the at least one anhydrous bleaching composition in paste form with at least one hydrogen peroxide oil-in-water emulsions comprising at least surfactant chosen from nonionic and anionic surfactants and at least one copolymer as described above, may be prepared significantly more quickly and more easily.
Furthermore, some of the compositions disclosed herein may be easy and quick to apply. These compositions may, for example, show very good adhesion and may not run outside the areas that it is desired to bleach.

In one embodiment, the disclosed bleaching compositions may also allow strong, uniform bleaching results, while at the same time may afford at least one very good cosmetic property.

The at least one anhydrous bleaching composition will first be described.

**Anhydrous Bleaching Composition**

In one embodiment, the at least one anhydrous composition may be in paste form. For example, the at least one anhydrous composition may comprise less than or equal to 1% by weight of water, relative to the total weight of the paste and, further, for example, less than or equal to 0.5% by weight of water, relative to the total weight of the paste.

**Peroxyoxygenated Salt**

The at least one peroxyoxygenated salt, may be chosen, for example, from persulfates, perborates, percarbonates and peroxydes of alkali metals and alkaline-earth metals, for instance, sodium, potassium and magnesium.

In one embodiment, the at least one peroxyoxygenated salt is a persulphate, such as sodium persulphate and potassium persulphate.

For example, the content of the at least one peroxyoxygenated salt in the at least one anhydrous bleaching composition may be present in an amount ranging from 10% to 70% by weight, relative to the total weight of the at least one anhydrous bleaching composition, and further, for example, from 20% to 60% by weight, relative to the total weight of the at least one anhydrous bleaching composition. Also, for example, the at least one peroxyoxygenated salt may be present in the composition disclosed herein, in an amount ranging from 5% to 35% by weight, relative to the total weight of the composition (i.e. comprising the mixture of the at least one anhydrous bleaching composition and the at least one oxidizing composition) and further, for example, from 10% to 30% by weight, relative to the total weight of the composition.

**Alkaline Agents**

In one embodiment, the at least one anhydrous bleaching composition also comprises at least one alkaline agent, which may, for example, be chosen from urea, ammonium salts, for instance, chlorides, sulphates, phosphates and nitrates; and alkali metal (such as, for example, sodium and potassium) and alkaline-earth metal (such as, for example, magnesium) silicates, phosphates and carbonates.

For example, the at least one alkaline agent in the at least one anhydrous bleaching composition may be present in an amount ranging from 0.01% to 40% by weight, relative to the total weight of the at least one anhydrous bleaching composition and further, for example, from 0.1% to 30% by weight, relative to the total weight of the at least one anhydrous bleaching composition. In one embodiment, the at least one alkaline agent in the composition disclosed herein, is present in an amount ranging from 0.005% to 20% by weight, relative to the total weight of the composition, and further, for example from 0.05% to 15% by weight, relative to the total weight of the composition.

**Inert Liquid**

The at least one anhydrous bleaching composition further comprises from 15% to 35% by weight of at least one inert organic liquid.

As used herein, the term "liquid" means a compound or a mixture of compounds that is liquid at 25° C. and at atmospheric pressure.

For example, the at least one inert organic liquid can be chosen from polyolefins, carboxylic acid monoesters and polyesters, sugar monoesters and polyesters of C₈-C₃₀ acids, cyclic esters, cyclic esters, silicone oils, mineral oils, and plant oils.

For instance, the polyolefines may be chosen from compounds of formula CₙH₂ₙ₊₂ wherein n is an integer ranging from 3 to 9, as from 3 to 7. These compounds correspond to the name "polydecene" of the CTFA Dictionary 7th edition 1997, of the Cosmetics, Toiletry and Fragrance Association, USA, and also to the same INCI name in the USA and in Europe. They are poly-1-decene hydrogenation products.

Non-limiting examples of polyolefins that may be used include the product sold under the name Silknflo® 366 NF Polydecene by the company Amoco Chemical and those sold under the name Nexbase® 2002 FG, 2004 FG, 2006 FG and 2008 FG by the company Formyn.

As used herein, the carboxylic acid monoesters and polyesters include: linear and branched, and saturated and unsaturated esters, they may, for example, comprise at least one C₈-C₃₀ hydrocarbon-based chain, further, for example, at least one C₆-C₈ hydrocarbon-based chain, such as at least one C₁₅-C₂₄ hydrocarbon-based chain, which may be derived from the acid and alcohol portion. The carboxylic acid monoesters and polyesters may also comprise at least one C₁-C₆ hydrocarbon-based chain and, for example, at least one C₁-C₅ hydrocarbon-based chain. In one embodiment, if the carboxylic acid comprises several carboxylic functional groups, these functional groups may, for example, all be esterified. It should be noted that the alcohols may, for example, be mono- or functional alcohols.

Examples of esters include esters of oleic acid, lauric acid, palmitic acid, myristic acid, behenic acid, stearic acid, linoleic acid, linolenic acid, capric acid, and arachidonic acid, and mixtures thereof, such as oleo-palmitic, oleo-stearic, and palmito-stearic.

Furthermore, non-limiting examples include isopropyl diesters of sebacic acid (such as diisopropyl sebacate), diocyl adipates and dicaprylyl maleates.

In one embodiment, it may be possible to use a polyester of a polycarboxylic acid comprising at least one group chosen from saturated and unsaturated, linear and branched groups comprising less than 6 carbon atoms, and of an alcohol comprising at least one group chosen from saturated and unsaturated, linear and branched groups with less than 6 carbon atoms. An example of the polyester of a polycarboxylic acid is triethyl citrate.

In another embodiment, the esters may be chosen from esters obtained from C₁₂-C₄₀ acids, for example, comprising at least one carboxylic group, and from saturated, linear and branched C₆-C₃₀ monoalcohols.

In one embodiment, the at least one inert liquid of the at least one anhydrous bleaching composition is chosen from isopropyl palmitate and isopropyl myristate, alone or as mixtures.

With regard to the sugar monoesters and polyesters of C₈-C₃₀ acids, such as C₁₂-C₂₄ acids, it is pointed out that the term "sugar" means compounds comprising several hydroxyl functional groups, with or without an aldehyde or ketone functional groups, and which comprise at least 4 carbon atoms. These sugars may be chosen, for example, from monosaccharides, olygosaccharides and polysaccharides. Non-limiting examples of suitable sugars include
sucrose (and saccharose), glucose, galactose, ribose, fucose, maltose, fructose, mannose, arabinose, xylose and lactose, and derivatives thereof, for example, alkyldervatives, such as methyl derivatives, for instance, methylglucose.

Examples of the saturated and unsaturated, linear and branched C₁–C₃₀ acids, comprising one or two carboxylic functional groups, include, as mentioned above, esters of oleic acid, lauric acid, palmitic acid, myristic acid, behenic acid, stearic acid, linoleic acid, linolenic acid, capric acid, and arachidonic acid, and mixtures thereof, such as oleo-palmitic, oleo-stearic, and palmito-stearic, isopropyl diesters of sebacic acid (such as diisopropyl sebacate), diocyl adipates and dicapryl maleates, triethyl citrate, and acids of sugars, such as sucrose (and saccharose), glucose, galactose, ribose, fucose, maltose, fructose, mannose, arabinose, xylose and lactose, and derivatives thereof, for example, alkyldervatives, such as methyl derivatives, for instance, methylglucose.

The esters may, for example, be chosen from monoesters, diesters, triesters, tetaesters and polyesters. For example, the esters may be chosen from monoesters and diesters, such as saccharose, glucose and methylglucosemonomers, monostearates, monobehenate, monoleoöl, monoöl, monolinoleate, monolinoleneate, monooleoölurates dioleate, diesterate, dibehenate, dioleomonoesterate, dinilolenate and dioleostearate.

Non-limiting examples of the monoesters and diesters include the product sold under the name Dulcote DO by the company Amerochol, which is a methylglucosediurate; the products sold under the names F160, F140, F110, F90, F70 and S1.40 by the company Crodesta denoting sacrose palmitoesters has sold 73% monoester and 27% diester and triester, 61% monoester and 39% diester, triester and diester, 52% monoester and 48% diester, triester and diester, 45% monoester and 55% diester, triester and tetraester, 39% monoester and 61% diester, triester and tetraester, and sucrose monoalurate; the products sold under the name Ryoto Sugar Esters, for example referenced B370 and corresponding to sucrose benenate formed of 20% monoester and 80% di-triester-polyester; sucrose mono-dipalmiostearate sold by the company Goldschmidt under the name Tegosoft PSE.

With regard to the cyclic esters and ethers, non-limiting examples includes γ-butyrolactone, dimethylisoboride (CTFA name), and diisopropylisoboride (CTFA name).

The at least one inert liquid may be chosen, for example, from silicone oils, with a viscosity of less than or equal to 10 000 mPa.s at 25 °C., the viscosity of the siloxanes being measured according to ASTM standard 445 Appendix C.

Silicone oils are defined in greater detail in Walter Noll’s “Chemistry and Technology of Silicones” (1968) – Academic Press.

Suitable silicone oils include, for example, the silicone oils sold under the names DC-200 Fluid-5 mPa.s, DC-200 Fluid-20 mPa.s, DC-200 Fluid-350 mPa.s, DC-200 Fluid-1 000 mPa.s and DC-200 Fluid-10 000 mPa.s by the company Dow Corning.

In one embodiment the at least one inert liquid is a mineral oil, such as liquid paraffin.

Other examples include plant oils, such as avocado oil, olive oil and liquid jojoba wax.

Additives

Amphiphilic Polymers:

In one embodiment, the at least one anhydrous bleaching composition may further comprise common additives, such as amphiphilic polymers comprising at least one hydrophobic chain. As used herein, the term “amphiphilic polymer” means that the said polymer comprises both a hydrophilic portion and a hydrophobic portion, for example, a hydrophobic chain. Examples of the at least one amphiphilic polymer include nonionic, anionic, cationic and amphoteric amphiphilic polymers. In one embodiment, the at least one amphiphilic polymer is of nonionic, anionic or cationic nature.

It should be noted that the at least one amphiphilic polymer present in the at least one anhydrous bleaching composition and the at least one copolymer present in the at least one oxidizing composition, which will be described in detail later, may be different.

For example, the at least one amphiphilic polymer may comprise, at least one hydrophobic chain chosen from, saturated and unsaturated, aromatic and non-aromatic, linear and branched C₈–C₃₀ hydrocarbon-based chains, and optionally comprising at least one oxalkylenyl (such as oxyethylene and oxypolyproylene) unit.

The cationic amphiphilic polymers comprising the at least one hydrophobic chain may, for example, be chosen from cationic polyurethanes and cationic copolymers comprising at least one vinylactam unit, such as vinylpyrrolidone units.

Even further, for example, the at least one amphiphilic polymers comprising at least one hydrophobic chain may be chosen from nonionic polyurethanes comprising at least one hydrophobic chain and nonionic amphiphilic polymers comprising at least one hydrophobic chain.

For example, the nonionic amphiphilic polymers comprising at least one hydrophobic chain, may be chosen from:

1. celluloses modified with groups comprising at least one hydrocarbon-based chain chosen from saturated and unsaturated, linear and branched C₈–C₃₀, hydrocarbon-based chains, for instance, hydroxyethylcelluloses modified with groups comprising at least one hydrophobic chain as defined previously, such as Natrosol Plus Grade 330 Cs(C₄₅, alkyl—sold by the company Aquadon); Beranocoll EHM 100 (sold by the company Berol Nobel), Amerecel Polymer HM-1500 (hydroxyethylethelulose modified with a polyethylene glycol (15) nonynphenyl ether group—sold by the company Amerochol).

2. hydroxpropylguar modified with groups comprising at least one hydrophobic chain as defined above, for example Jaguar XC-95/3 (C₁₄ alkyl chain—sold by the company Rhodia Chimie); Esafol HM 22 (C₂₂ alkyl chain—sold by the company Lamberti); RE210-18 (C₁₄ alkyl chain) and RE205-1 (C₂₀ alkyl chain) sold by the company Rhodia Chimie.

3. copolymers of vinylpyrrolidone and of hydrophobic monomers comprising at least one hydrophobic chain as defined above, for instance, Antaron and Ganex V216 (vinylpyrrolidone/hexadecene copolymers); Antaron and Ganex V220 (vinylpyrrolidone/eicosene copolymers), sold by the company I.S.P.

4. copolymers of C₁–C₈ alkyl (meth)acrylates and of amphiphilic monomers comprising at least one hydrophobic chain.

5. copolymers of hydrophobic (meth)acrylates and of hydrophobic monomers comprising at least one hydrophobic chain, for instance, a polyethylene glycol methacrylate/lauryl methacrylate copolymer.

6. polymers with an aminoalcohol ether skeleton comprising at least one fatty chain, such as the Pure Thix compounds sold by the company Süd-Chemie.

7. linear (block structure), grafted and starburst polyurethane-polyethylenes comprising in their chain at least one hydrophobic block, which is generally a polyoxyethylene
block which may comprise from 50 to 1,000 oxyethylene units, and at least one hydrophobic block, which may comprise aliphatic groups alone, optionally combined with cyclolipophilic and/or aromatic sequences. For example, the polyurethanopolyethers may comprise at least two \( C_{2} - C_{30} \) hydrocarbon-based hydrophobic chains, separated by the at least one hydrophilic block; the hydrophobic chains may be pendant chains or chains with at least one of the end groups of the at least one hydrophilic block.

The polyurethanopolyethers may comprise a urethane bond between the at least one hydrophilic block. By extension, polyurethanopolyethers wherein the at least one hydrophilic block is linked to lipophilic blocks via other chemical bonds are also included.

The polyurethanopolyethers that may be used in the compositions disclosed herein include those described in the article by G. Fennum, J. Bakke and P. Hansen—Colloid Polym. Sci. 271, 380-389 (1993). Further examples of polyurethanopolyethers that may be mentioned include Nuvix EX 1100 (European and US INCI name “Steareth-100/PEG-136/HMDI Copolymer” sold by the company Servo Delden); Rhodolate 205, 206, 204 and 212 (sold by the company Rheox); Elfacos T210 (C12-C14 alkyl chain) und Elfacos T121 (C18 alkyl chain) sold by the company Akzo.

In one embodiment, the at least one hydrophilic chain of the anionic amphiphilic polymers may be chosen from saturated and unsaturated, aromatic and non-aromatic, linear and branched \( C_{6} - C_{30} \) hydrocarbon-based chains.

In one embodiment, the anionic amphiphilic polymers comprising at least one hydrophobic chain that may be used in the compositions disclosed herein, which may be crosslinked or non-crosslinked. They may also comprise at least one hydrophilic unit derived from at least one ethylenically unsaturated monomer bearing a free, partially or totally neutralized carboxylic acid functional group, and at least one hydrophobic unit derived from at least one ethylenically unsaturated monomer bearing at least one hydrophobic side chain, and optionally at least one crosslinking unit derived from at least one polysaturated monomer.

The at least one ethylenically unsaturated monomer bearing a carboxylic acid functional group may be chosen, for example, from ethacrylic acid, methacrylic acid and acrylyic acid.

The at least one ethylenically unsaturated monomers bearing at least one hydrophobic side chain may, for example, be chosen from esters of unsaturated carboxylic acids, such as ethacrylic acid, methacrylic acid and acrylic acid, and saturated, linear and branched, \( C_{3} - C_{30} \) alcohols, such as \( C_{2} - C_{22} \) alcohols. The at least one ethylenically unsaturated monomers bearing at least one hydrophobic side chain may also be chosen from allylic ethers of saturated and unsaturated, aromatic and non-aromatic, branched and unbranched \( C_{6} - C_{35} \) alcohols, which are optionally oxylkenated, for example, oxylkenated, further, for example, from monomers of formula \( CH_{2} = CRCH_{2}OB \) wherein \( R \) is chosen from \( H \) and \( CH_{3} \); B is ethylenoxylene, n is an integer ranging from 0 to 100, R is a hydrocarbon-based group chosen from alkyl, aryalkyl, aryl, aralkyl and cycloalkyl groups comprising from 8 to 30 carbon atoms. For example, the unit may be such that \( R \) is hydrogen, n is equal to 10 and R is a stearyl \( (C_{18}) \) group.

In one embodiment, the at least one crosslinking monomer, this monomer may comprise at least two polymerizable double bonds that are not conjugated with each other. For example, the at least one crosslinking monomer may be chosen from diallylphthalate, allyl (meth)acrylate, divinylbenzene, (poly)ethylene glycol dimethacrylate, methylenebisacrylamide, polyallylsueroate and polyallylpentacrylylriol.

Anionic amphiphilic polymers of the type described above are described and prepared, for example, in U.S. Pat. Nos. 5,915,921 and 4,509,499 (copolymer of (meth)acrylic acid and of \( C_{10} - C_{30} \) alkyl (meth)acrylates) or in Patent No. EP 216 479 (copolymer of (meth)acrylic acid and of fatty alkyl allyl ethers).

Examples of the amphiphilic polymers of the type described above include Carbopol ETD 2020 (acrylic acid/ \( C_{10} - C_{30} \) alkyl methacrylate crosslinked copolymer—sold by the company Goodrich); Carbopol 1382, Penmul TR1 and Penmul TR2 (acrylic acid/\( C_{10} - C_{30} \) alkyl acrylate crosslinked copolymer—sold by the company Goodrich); oxycetyleneated methacrylic acid/ethyl acrylate/stearyl methacrylic acid copolymer (55/35/10); oxycetyleneated (25 E0) (meth)acrylic acid/ethyl acrylate/benzenyl methylacrylate copolymer and methacrylic acid/ethyl acrylate/steareth-10 alkyl ether crosslinked copolymer.

In one embodiment, amphiphilic polymers used in the composition disclosed herein, are present in an amount ranging from 0.01% to 30% by weight, relative to the total weight of the composition. Water-soluble thickening polymers not comprising a hydrophobic chain:

In one embodiment, the at least one anhydroous bleaching composition may further comprise at least one water-soluble thickening polymer not comprising a hydrophobic chain.

The at least one water-soluble thickening polymer may, for example, be chosen from polymers of natural origin and synthetic polymers, and, further, for example, be chosen from those conventionally used in cosmetics. In addition, the at least one water-soluble thickening polymer does not contain a hydrophobic chain, i.e. hydrophobic chains chosen from saturated and unsaturated, aromatic and non-aromatic, linear and branched \( C_{6} - C_{30} \) hydrocarbon-based chains, optionally comprising at least one oxalkylene (oxyethylene and/or oxypropylene) unit.

Non-limiting examples of these polymers include: polyvinylpyrrolidone, polyacrylic acid, polyacrylamide, non-crosslinked poly(2-acrylamido-2-methylpropanesulfonic acid) (Simugel EG from the company SEPPIC), crosslinked poly (2-acrylamido-2-methylpropanesulfonic acid), free and partially neutralized with ammonia (Hostacryl AMPS from Clariant), mixtures of non-crosslinked poly(2-acrylamido-2-methylpropanesulfonic acid) with hydroxyalkylicellulose ethers and with poly(ethylen oxides), as described in U.S. Pat. No. 4,540,510; mixtures of poly(2-(meth)acrylamido (\( C_{1} - C_{9} \))alklysulfonic acid), which may, for example, be crosslinked, with a crosslinked copolymer of maleie anhydride and a (\( C_{1} - C_{2} \))alkyl vinyl ether (Hostacryl AMPS/ Stabilize QM from the company IFD).

The water-soluble thickening polymers of natural origin may, for example, be chosen from polymers comprising at least one sugar unit, for example, nonionic guar gums, optionally modified with at least one \( C_{1} - C_{9} \) hydroxyalkyl group; biopolysaccharide gums of microbial origin, such as scleroglucan gum and xanthan gum; gums derived from plant exudates, such as gum arabic, ghatti gum, karnya gum, gum tragacanth, carrageen gum, agar gum and carob gum; pectins; alginites; starches; hydroxy(\( C_{1} - C_{9} \))alkylcelluloses and carboxy(\( C_{1} - C_{6} \))alkylcelluloses.

As used herein, the term “sugar unit” means a monosaccharide (i.e. monosaccharide or oxide or simple sugar) portion, an oligosaccharide portion (short chains formed from a sequence of monosaccharide units, which may be different) or a polysaccharide portion (long chains consisting
of monosaccharide units, which may be different, i.e. poly-
holosides or polysaccharides]. The saccharide units may also be
substituted with at least one substituent chosen from alkyl,
hydroxyalkyl, alkoxy, acyloxy and carboxylic groups, the
alkyl groups comprising from 1 to 4 carbon atoms.

Examples of nonionic, unmodified guar gums include
Guargel D/15 (Goorich); Vydrogel GH 175 (Unipet),
Maypro-Guar 50 and Jaguar C (Meyaial/Rhodia Chimie);
and examples of the modified monosaccharide gums include
Jaguar HP8, HP60, HP120, DC 293 and HP 105 (Meyaial/
Rhodia Chimie); Galactosil 4H4F2 (Aqualon).

Examples of biopolysaccharide gums of microbial or
plant origin are well known to those of ordinary skill in the
art and are described, for example, in the book by Robert L.
Davidson entitled “Handbook of Water soluble gums and

Non-limiting examples of these gums include seleroglu-
cans, such as Actigum CS from Sanofi Bio Industries;
Amigel from Alban Muller International, and also the gly-
oxil-tretured seleroglucons described in Patent No. FR 2
633 940; xanthan gums, for example, Kelret, Kelrol T, Kelrol
St, Kelrod Bi, Kelrod Rd, Kelrol Cg (Nutrasweet Kelco),
Rhodotec S and Rhodotec H (Rhodia Chimie); starch
derivatives, for example, Primagel (Avebe); hydroxyethyl-
celluloses, such as Cellosolve QPL, QP4400H, QP30000H,
HEC30000A and Polymer PCG10 (Amerchol), Natrosol
250HHR, 250MR, 250M, 250HXXR, 250HHX, 250HR,
10X (Hercules) and Tylose H1000 (Hoechst); hydroxypro-
pylecelluloses, for example, Klucel EF, H, LH, MF and G
(Aqualon); carboxymethylcelluloses, such as Blanose 7MB/
SF, refined 7M, 7LM, 7MF, 9M3F, 12M631XP, 12M31P,
9M31XF, 7H, 7M31, 7H35XF (Aqualon), Aquorsorb A500
(Hercules), Ambergum 1221 (Hercules), Cellogen HP810A,
HP6HS9 (Montello) and Primellose (Avebe).

In one embodiment, the at least one water-soluble thick-
ening polymer not comprising a hydrophobic chain, are
present in an amount ranging from 0.01% to 30% by weight,
relative to the total weight of the at least one anhydrous
bleaching composition.

Surfactants:
The at least one anhydrous bleaching composition may
also comprise at least one surfactant chosen from anionic,
nionic, cationic, amphoter, and zwitterionic surfactants.

Non-limiting examples of the anionic surfactants that
can be used in the compositions disclosed herein include salts
(for example, alkali metal salts, such as sodium salts,
ammonium salts, amine salts, amino alcohol salts and mag-
nesium salts) of the following compounds: alkyl sulphates,
alcohol ethoxylates, alkylamido ether sulphates, alkyl-
laryl polyether sulphates, monoglyceride sulphates; alkyl
sulphonates, alkyl phosphates, alkylamido sulphonates;
alkylary sulphonates, α-olefin sulphoxides, paraffin sulpha-
notes; (C\(_6\)-C\(_9\)) alkyl sulphosuccinates, (C\(_6\)-C\(_9\))alkyl
ether sulphosuccinates, (C\(_6\)-C\(_9\))[alkylamido sulphosuccinates;
(C\(_6\)-C\(_9\))alkyl sulphoneoates; (C\(_6\)-C\(_9\))acetyl sarcosinates
and (C\(_6\)-C\(_9\))acetyl glutamates. It is also possible to use
(C\(_6\)-C\(_9\)[alkylpolyglycoside carboxylic esters, such as alkyl-
glyceride citrates, alkylglycoside tartrates and alkylglyco-
side sulphosuccinates, alkylsulphosuccinates; acyl
isethionates and N-acyl taurates, wherein the alkyl and acyl
groups of all of these different compounds, for example,
comprises from 12 to 20 carbon atoms and the aryl group
may, for example, be chosen from phenyl and benzyl groups.

Among the anionic surfactants which can also be used,
non-limiting mention may be made of fatty acid salts (for
example, C\(_6\)-C\(_9\))[acid salts], such as oleic, ricinoleic
and palmitic acid salts, coconut oil acid and hydrogenated
coconut oil acid, and, for example, sodium, calcium and mag-
nesium salts of stearic acid; acyl lactylates wherein the acyl
group comprises from 8 to 20 carbon atoms. It is also
possible to use alkyl D-galactoside uronic acids and their
salts, polyoxyalkylated (C\(_6\)-C\(_9\))alkyl ether carboxylic acids,
polyoxyalkylated (C\(_6\)-C\(_9\))[alkylaryl ether carboxy-
l acid salts, polyoxyalkylated (C\(_6\)-C\(_9\))[alkylamido ether carboxy-
lic acids and their salts, for example those comprising
from 2 to 50 alkylene oxide groups, such as ethylene oxide
groups, and mixtures thereof.

Without wishing to be limited thereto, the nonionic sur-
factants may also be chosen, for example from polyethoxy-
lated and polypropoxylated, alkylphenols, alpha-diols
and alcohols, comprising at least one chain comprising,
for example, from 6 to 24 carbon atoms, and further,
from example, from 8 to 22 carbon atoms, it being possible
for the number of ethylene oxide and/or propylene oxide groups
to range, for example, from 1 to 50. Further examples also
include copolymers of ethylene oxide and of propylene oxide,
condensates of ethylene oxide and propylene oxide
with fatty alcohols (for example, C\(_6\)-C\(_9\)), polyethoxylated
fatty amides (for example, C\(_6\)-C\(_9\)), for example, comprising
from 2 to 30 mol of ethylene oxide, monoglycerolated
and polyglycerolated fatty alcohols (for example, C\(_6\)-C\(_9\))
comprising, for example, from 1 to 30 glycerol groups
and polyglycerolated fatty amides (for example, C\(_6\)-C\(_9\))
comprising, for example, from 1 to 5 glycerol groups,
and, further, for example, from 1.5 to 4, glycerol groups;
oxylonated fatty acid esters (for example, C\(_6\)-C\(_9\)) of sorbi-
con comprising, for example, from 2 to 30 mol of ethylene
oxide; fatty acid esters (for example, C\(_6\)-C\(_9\)) of sucrose,
fat acid esters (for example, C\(_6\)-C\(_9\)) of polyethylen glycol,
alkylpolyglycosides, N-alkylglucamine derivatives,
and amine oxides, such as (C\(_6\)-C\(_9\))[alkylamine oxides and
N-acylaminopropylmorpholine oxides.

For example, the amphoter or zwitterionic surfactants
may chosen from aliphatic secondary and tertiary amine
derivatives wherein the aliphatic group is chosen from linear
and branched C\(_6\)-C\(_9\) chains comprising at least one anionic
group chosen from carboxylate, sulphonate, sulphate, phos-
phate and phosphonate groups; (C\(_6\)-C\(_9\))[alkylbetaines,
(C\(_6\)-C\(_9\))[alkylsulphonates, (C\(_6\)-C\(_9\))[alkylamidocarboxylo-
nates, and (C\(_6\)-C\(_9\))[alkylamidocarboxylo-
ates. Further examples include amphotolybruylglyci-
ealates and amphotolybruylpropionates, classified in the
CTFA dictionary, 5th edition, 1993, under the names Diso-
Dium Cocamidopropionate, Disodium Lauroammid-
acate, Disodium Caprylamidopropionate, Disodium Capryl-
ampolaphedropriionate, Disodium Lauramidophedroprio-
nate, Disodium Caprylamohipropionate, Lauramidophedroprio-
nate and Cocamidopropionic acid and Cocamidopropionic acid.
For example, mention may be made of Cocamidophodi-
acetate (Miranol® C2M Concentrate from Rhodia Chimie).

The cationic surfactants may, for example, be chosen
from salts of optionally polyoxyalkylated primary, sec-
ondary and tertiary fatty amines; quaternary ammonium
salts, such as tetraethylammonium, alkylamidoalkyltri-
alklammonium, trialkylbenzylammonium, trialklyhydroxy-
alkylammonium or alkylpyridinium chlorides and bromides;
imidazoline derivatives; and amine oxides of cationic
nature.

For example, when the at least one surfactant is present,
it may be chosen from anionic and nonionic compounds.

In one embodiment, the at least one surfactant is present
in the at least one anhydrous bleaching composition, its
content is such that the total surfactant content in the ready-to-use composition ranges, for example, from 0.05% to 30% by weight, and, further, for example from 0.1% to 20% by weight.

Cationic and Amphoterically Substantive Polymer:

In one embodiment, the at least one anhydrous bleaching composition comprises at least one substantive polymer chosen from cationic and amphoterically substantive polymers. Polymers of this type may, for example, make it possible to improve the cosmetic properties of the fibers (conditioning effect).

As used herein, the expression “cationic polymer” means any polymer comprising at least one group chosen from cationic groups and groups that may be ionized into cationic groups.

The cationic and amphoterically polymers that may, for example, be used in the compositions disclosed herein may be chosen from those already known in the patent literature, the list of these is described in the Patents and Patent Applications Nos. EP 337 354, FR 2 270 846, FR 2 383 660, FR 2 598 611, FR 2 470 596, FR 2 519 863, FR 2 788 974 and FR 2 788 976 for a list of these compounds.

The cationic polymers may, for example, be chosen from cationic polymers comprising at least one group chosen from primary, secondary, tertiary and quaternary amine groups, which may either form part of the main polymer chain and may be borne by a side substituent directly attached to the main polymer chain.

Further non-limiting examples of the cationic polymers include:

1. copolymers of acrylamide and of dimethylaminomethyl methacrylate quaternized with dimethyl sulphate and with a dimethyl halide (Hercosil from Hercules); copolymers of acrylamide and of methacryloyloxytrimethylammonium chloride (Bina Quat P 100 from Ciba Geigy); copolymers of acrylamide and of methacryloyloxyethyltrimethylammonium methosulphate (Reten from Hercules); quaternized and non-quaternized vinylpyrrolidone/diallylaminomethy acrylate and methacrylate copolymers (Gafquat range from ISP; Copolymer 845, 958 and 937 from Gaf Corporation (ISP)); dimethylaminooethyl methacrylate/vinylcaprolactam/vinylpyrrolidone terpolymers (Gaflox VC 713 from ISP); vinylpyrrolidone/methacrylamidopropyl-dimethylamine copolymers (Styleze CC 10 from ISP); vinylpyrrolidone/dimethylaminopropylmethacrylamide quaternized copolymers (Gafquat HS 100 from ISP).

2. Cellulose ether derivatives comprising quaternary ammonium groups, as described in Patent No. FR 1 492 597. These polymers are also defined in the CTFA dictionary as quaternary ammoniums of hydroxyethylcellulose which has reacted with an epoxide substituted with a trimethylammonium group.

3. Cationic cellulose derivatives, such as copolymers of cellulose and cellulose derivatives grafted with a water-soluble quaternary ammonium monomer, described, for example, in U.S. Pat. No. 4,131,576, such as hydroxyalkylcelluloses, for instance, hydroxyethylcellulose, hydroxyethylcellulose and hydroxypropylcellulose grafted, for example with a salt chosen from methacryloyethyltrimethylammonium, methacrylamidopropyltrimethylammonium and dimethylhydroxymethylammonium salts.

(4) The cationic polyacrylamides described more, for example, in U.S. Pat. Nos. 3,589,578 and 4,031,307, such as guar gums comprising trialkylammonium cationic groups. Guar gums modified with a salt, such as chloride. For example, guar gums modified with a salt of 2,3-epoxypropyltrimethylammonium chloride may be used.

(5) Polymers comprising piperazinyl units and divalent alkylene and hydroxyalkylene groups comprising straight and branched chains, optionally interrupted with at least one one chosen from oxygen, sulphur and nitrogen and aromatic and heterocyclic groups, and also the oxidation and quaternization products of these polymers. Such polymers are described, for example, in Patent Nos. FR 2 162 025 and FR 2 280 361.

(6) Water-soluble polymethacrylamides prepared, for example, by polycondensation of an acidic compound with a polyamine, which are optionally crosslinked, optionally alkylated, or, if they comprise at least one tertiary amine functional group, quaternized. These polymers are described, for example in Patent Nos. FR 2 252 840 and FR 2 368 508.

(7) Polyaminoamide derivatives resulting from the condensation of polyalkylene polyamines with polycarboxylic acids followed by an alkylation with difunctional agents. Examples of these polyaminoamide derivatives include adipic acid-diallylaminohydroxyalkyldiallylamine triamine polymers wherein the alkyl group is C₁₋₄. Such polymers are described, for example, in Patent No. FR 1 583 363.

(8) Polymers obtained by reacting a polyalkylene polyamine comprising two primary amine groups and at least one secondary amine group with a dicarboxylic acid chosen from diglycolic acid and saturated C₁₋₄ aliphatic dicarboxylic acids, and then with epichlorohydrin. Such polymers are described, for example, in U.S. Pat. Nos. 3,227,615 and 2,961,347.

(9) Cycopolymers of alkylallylamine and of dialkylallylamine, in homopolymer or copolymer form, as described in Patent No. FR 2 080 759 and in its Certificate of Addition No. 2 190 406.


Examples of these polymers, used as disclosed herein, comprise repeating units corresponding to the following formula:

$$\text{R}^+ \text{X}^- \text{CH}_2 \text{CH}_2 \text{CH}_2 \text{CH}_2 \text{N}^+ \text{H}^- \text{X}^- \text{CH}_2 \text{CH}_2 \text{CH}_2 \text{CH}_2 \text{R}^-$$

wherein R, which may be identical or different, is chosen from C₁₋₄ alkyl and hydroxyalkyl; n and p, which may be identical or different, are integers ranging from 2 to 20; and X⁻ is an anion chosen from anions derived from mineral and organic acids.
(1) Poly(quaternary ammonium) polymers comprising repeating units of formula:

\[
\begin{array}{c}
\text{CH}_3 \text{N}^+ \text{(CH}_2)_p \text{NH}^- \text{CO}^+ \text{D} \text{NH}^- \text{(CH}_2)_q \text{O}^- \text{CH}_3 \\
\text{CH}_3
\end{array}
\]

wherein \( p \) is an integer ranging from 1 to 6, \( D \) may be nothing or may represent a group \(-\text{(CH}_2)_r\text{CO}^-\), \( r \) is an integer equal to 4 or 7, and \( X^- \) is an anion. Such polymers may be prepared according to the processes described in Patent Nos. U.S. Pat. No. 4,157,388, U.S. Pat. No. 4,702,906, U.S. Pat. No. 4,710,288 and EP 122 524.

(13) Polyamines of the polyethylene glycol (15) tallow polyamine type (CTIA dictionary name).

(14) Crosslinked methacryloyloxy(\( C_1 \)-\( C_2 \))alkyletri(\( C_1 \)-\( C_4 \))alkyaminium salt polymers, such as the polymers obtained by homopolymerization of dimethylaminoethyl methacrylate quaternized with methyl chloride, or by copolymerization of acrylamide with dimethylaminoethyl methacrylate quaternized with methyl chloride, the homopolymerization being followed by crosslinking with a compound comprising olefinic unsaturation, for example, methylenebisacrylamide. A crosslinked acrylamide/methacryloyloxyethyltrimethylammonium chloride copolymer (20/80 by weight) in the form of a dispersion comprising 50% by weight of the said copolymer in mineral oil can, for example, be used. This dispersion is sold under the name “Salcare® SC 92” by the company Allied Colloids. A crosslinked methacryloyloxyethyltrimethylammonium chloride homopolymer comprising about 50% by weight of the homopolymer in mineral oil or in a liquid ester can also be used. These dispersions are sold under the names “Salcare® SC 95” and “Salcare® SC 96” by the company Allied Colloids.

Further examples of cationic polymers that can be used in the compositions disclosed herein include polyallylenamines, such as polyethyleneamines, polymers comprising at least one unit chosen from vinylpyridine and vinylpyridinium units, condensates of polyamines and of epichlorohydrin, quaternary polyureylenes and chinin derivatives.

The amphoteric polymers may, for example, be chosen from polymers comprising units K and M randomly distributed in the polymer chain, wherein K is a unit derived from a monomer comprising at least one basic nitrogen atom and M is a unit derived from an acidic monomer comprising at least one carboxylic and sulphonate groups, or alternatively K and M, which may be identical or different, may be chosen from groups derived from zwitterionic carboxybetaine and sulphonobetaine monomers:

K and M, which may be identical or different, may also be chosen from cationic polymers comprising at least one group chosen from primary, secondary, tertiary or quaternary amine groups, wherein at least one of the amine groups bears a carboxylic or sulphonate group linked via a hydrocarbon-based radical, or alternatively K and M, which may be identical or different, form part of a chain of a polymer comprising \( \alpha,\beta\)-dicarboxylic ethylene units wherein one of the carboxylic groups has been made to react with a polyamine comprising at least one amine group chosen from primary or secondary amine groups.

The amphoteric polymers corresponding to the above definition may be chosen, for example, from the following polymers:

(1) Polymers resulting from the copolymerization of a monomer derived from a vinyl compound bearing a carboxylic group, such as acrylic acid, methacrylic acid, maleic acid, \( \alpha\)-chloroacrylic acid, and a dialkyl diallylammonium salt, such as dimethyliallylammonium chloride, and a basic monomer derived from a substituted vinyl compound comprising at least one basic atom, such as dialkylaminoalkyl methacrylate and acrylate, dialkylation aminoalkyl methacrylamide and -acrylamide. Such compounds are described in U.S. Pat. No. 3,836,537. Mention may also be made of the sodium acrylate/acylamidopropytrimethylammonium chloride copolymer (Polyquart KE 3033 by the company Henkel) and the acrylic acid/dimethyl diallylammonium chloride copolymer (Mercquat 280, 295, Plus 3340, from Câlon).

(2) Polymers comprising units derived from a) at least one monomer chosen from acrylamides and methacrylamides substituted on the nitrogen with an alkyl radical, for example, \( C_1-C_2 \) (such as ethyl, tert-butyl, tert-octyl, octyl, decyl and dodecyl), b) at least one acidic monomer comprising at least one reactive carboxylic group (for example, acrylic acid, methacrylic acid, crotonic acid and itaconic acid, and monoesters of maleic and fumaric acids and anhydrides), and c) at least one basic monomer, such as esters comprising at least one substituent chosen from primary, secondary, tertiary and quaternary amine substituents of acrylic acid, methacrylic acid, fumaric acid and maleic acid, and products of quaternization of dimethylaminoethyl methacrylate with dimethyl and diethyl sulphate (for example, aminoethyl, butylaminoethyl, N,N-dimethylaminoethyl and N-tert-butyllarninoethyl methacrylates).

Ocetylacrylamide/acrylate/butylaminoethyl methacrylate copolymers (Amphomer or Lovocryl 47 by the company National Starch) may, for example, be used.

(3) Crosslinked and partially or totally alkyalted polyaminoamides, derived from polyaminoamides of general formula \(-\text{CO}^-\text{R}^-\text{CO}^-\text{Z}^-\), wherein \( R \) is chosen from divalent groups derived from saturated and unsaturated dicarboxylic acids (for example, adipic acid, 2,2,4,4-tetrahydridic acid, 2,4,4-trimethyladipic acid, terephthalic acid and itaconic acid), unsaturated monocarboxylic acids (for instance, \( \text{methacrylic acid}, C_2-C_6 \) alkyl esters of these mentioned acids and groups derived from the addition of one of these acids to a bis-primary or bis-secondary amine, and \( Z \) is chosen from groups of bisprimary, mono- and bis-secondary polyalkylene-polyamines. For example, \( Z \) represents:

(a) from 60 to 100 mol %, \(-\text{NH}^-\text{-(CH}_2)_x\text{NH}^+\), wherein \( x = 2 \) and \( p = 2 \), or \( x = 3 \) and \( p = 2 \), and wherein the group \( Z \) is derived from diethylthrethramine, from triethylenetetramine and from dipropyleneamine;
(b) from 0 to 40 mol %, wherein \( x = 2 \) and \( p = 1 \) and wherein the group is derived from ethylenediamine, or the group derived from piperazine —\( \text{N}[(\text{CH}2\text{CH}2)2\text{N}] \) —; 
(c) from 0 to 20 mol %, —\( \text{N}[(\text{CH}2)6\text{NH}] \) — derived from hexamethylenediamine. The crosslinking agent for these polymers is a bifunctional agent chosen from epichlorohydrin, diepoxides, diamidines and bis-unsaturated derivatives, and alkylated by the action of acrylic acid, chloroacetic acid and alkane sulfone (for example, propane sulfone and butane sulfone) and the alkali metal salts thereof.

(4) Polymers comprising at least one zwitterionic unit, for example, the butyl methacrylate/dimethylcarboxymethylammonioethyl methacrylate copolymer (Diaformer Z301 from Sandoz).

(5) Polymers derived from chitosan comprising monomer units chosen from the following formulae (I), (II) and (III) below:

```
[CH2OH]
H H
\( \text{O} \)
\( \text{H} \)
\( \text{OH} \)
\( \text{NICOCH3} \)
```

wherein \( \text{R} \) is chosen from hydrogen, \( \text{CH3-O} \), \( \text{CH3CH2-O} \) and phenyl, \( \text{R}_2 \) and \( \text{R}_3 \), which may be identical or different, are chosen from hydrogen and alkyl groups (such as methyl and ethyl), \( \text{R}_4 \) is chosen from alkyl groups (such as methyl and ethyl) and groups of formula \( \text{R}_5 \) — \( \text{N}[(\text{CH}2)2] \) —, wherein \( \text{R}_5 \) is chosen from \( \text{—(CH}2\text{)}_2 \) — and \( \text{—CH}2\text{-CH}2\text{(CH}2\text{)}_2 \) —, and also the higher homologues of these groups and comprising up to 6 carbon atoms, and \( r \) is chosen such that the molecular weight of the polymer ranges from 500 to 6 000 000, such as from 1 000 to 1 000 000.

(8) Amphoteric polymers of the type -D-X-D-X- chosen from:

a) polymers obtained by the action of chloroacetic acid or sodium chloroacetate on compounds comprising at least one unit of formula \(-\text{D-X-D-X-}\) wherein \( D \) is \( \text{—N}[(\text{CH}2\text{CH}2)2] \text{N} \) (piperazinyl) and \( X \) is chosen from symbols \( E \) and \( E' \), wherein \( E \) and \( E' \), which may be identical or different, may be chosen from divalent alkylene groups comprising at least one chain chosen from straight and branched chains comprising up to 7 carbon atoms in the main chain, wherein the divalent alkylene groups are optionally substituted with at least one hydroxyl group and possibly further also comprising at least one entity chosen from oxygen, nitrogen and sulphur, and from 1 to 3 aromatic and heterocyclic rings; wherein the oxygen, nitrogen and sulphur atoms can be present in the form of at least one group chosen from ether, thioether, sulphoxide, sulphone, sulphonium, alkylamine and alkenylamine groups, hydroxyl, benzylamine, amine oxide, quaternary ammonium, amide, imide, alcohol, ester and urethane groups;

b) polymers of formula \(-\text{D-X-D-X-}\) wherein \( D \) is \( \text{—N}[(\text{CH}2\text{CH}2)2] \text{N} \) (piperazinyl) and \( X \) is chosen from symbols \( E \) and \( E' \) and at least one is chosen from \( E' \); wherein \( E \) has the meaning defined above and \( E' \) is chosen from divalent alkylene groups comprising at least one chain chosen from straight and branched chains comprising up to 7 carbon atoms in the main chain, wherein the divalent alkylene groups are optionally substituted with at least one hydroxyl group and
comprising at least one nitrogen, wherein the nitrogen atom is substituted with an alkyl chain, which is optionally interrupted by an oxygen atom and wherein the divergent alkylene groups comprise at least one functional group chosen from carboxylic and hydroxyl functional groups and wherein the alkyl chain can be betainized by reaction with chloroacetic acid or sodium chlororacetate.

(9) 

$\text{(C}_1\text{C}_2\text{alkyl vinyl ether/maleic anhydride copolymers partially modified by semiamidation with an N,N-dialkylaminoalkylamine, such as N,N-dimethylamino-propylamine or by semiesterification with an N,N-dialkanaminoalkylamine. These copolymers can further comprise other vinyl copolymers, such as vinylcaprolactam.}}$

Among all the cationic and amphoteric polymers that may be used, in the composition disclosed herein, non-limiting examples include:

(i) among the cationic polymers:

- dimethylalkylammonium chloride homopolymers (Merquat 100 DRY from Nafto);
- copolymers of dimethylalkylammonium chloride and of acrylamide (Merquat 2200 from Nafto);
- Polymers of poly(quinuclidium ammonium) prepared and described in French Patent No. 2 270 846, comprising repeating units chosen from units of formulae (W) and (U) below:

\[
\begin{align*}
\text{(W)} & : \\
\text{CH}_3 & \text{CH}_3 \\
\text{N}^+ & \text{(CH}_2\text{)}_2 \text{N}^+ \\
\text{CH}_3 & \text{CH}_3
\end{align*}
\]

and, for example, those polymers comprising repeating units of formula (W) with a molecular weight, determined by gel permeation chromatography, ranging from 9 500 to 9 900;

\[
\begin{align*}
\text{(U)} & : \\
\text{CH}_3 & \text{C}_2\text{H}_5 \\
\text{N}^+ & \text{(CH}_2\text{)}_2 \text{N}^+ \\
\text{CH}_3 & \text{C}_2\text{H}_5
\end{align*}
\]

and, for example, those polymers comprising repeating units of formula (U) with a molecular weight, determined by gel permeation chromatography, of about 1 200;

- polymers of poly(quinuclidium ammonium) of family (11) wherein $X$—is chlorine, and, for example, those polymers with a weight-average molecular mass of less than 100 000 and, for example, less than or equal to 50 000;

(ii) among the amphoteric polymers:

- dimethylalkylammonium chloride/acrylic acid copolymer (80/20) (Merquat 280 Dry from Calgon—CTFA name: Polyquaternium 22);
- dimethylalkylammonium chloride/acrylic acid copolymer (95/5) (Merquat 295 Dry from Calgon);
- methacrylamidopropyltrimonium chloride, acrylic acid and ethyl acrylate copolymer (Merquat 2001 from Calgon—CTFA name: Polyquaternium 47);
- acrylamide/dimethylalkylammonium chloride/acrylic acid terpolymer (Merquat Plus 3330 Dry from Calgon—CTFA name: Polyquaternium 39).

Other Additives

The at least one anhydrous bleaching composition may also comprise at least one mineral filler, for example, clays and silicas, such as fumed silicas of hydrophilic and hydrophobic nature.

- It may also comprise at least one binder, such as vinylpyrrolidone, at least one lubricant, for instance, polyolestearines and alkali metal and alkaline-earth metal stearates, and also agents for controlling the release of oxygen, such as magnesium carbonate and magnesium oxide.

The at least one anhydrous bleaching composition may comprise, where appropriate, at least one agent chosen from dyes, mattifying agents, for example, titanium oxides, sequestering agents, vitamins and provitamins, sunscreens, silicas, and fragrances.

In one embodiment, the at least one anhydrous bleaching composition in paste form may conventionally be prepared by dispersing, with mechanical stirring, all of the pulvulent compounds in the inert liquid, in which the other liquid compounds of the bleaching composition have previously been dispersed or mixed.

In one embodiment, the at least one anhydrous bleaching composition may also be prepared via extrusion, by introducing the liquid and solid phases of the composition into the extruder and then mixing them at a temperature below 25°C. using a co-rotating twin-screw system composed of transportation and blending members.

The oxidizing composition will now be described.

Oxidizing Composition

In one embodiment, the at least one oxidizing composition is a hydrogen peroxide oil-in-water emulsion comprising at least one surfactant chosen from nonionic and anionic surfactants and at least one copolymer obtained from at least one ethylenically unsaturated monomer comprising at least one sulphonic group, in free or partially or totally neutralized form and comprising at least one hydrophobic unit.

Surfactants

With regard to the nonionic and anionic surfactants, reference may be made to the lists detailed previously in the context of the description of the components comprising the at least one anhydrous bleaching composition.

For example, the at least one surfactant may be chosen from alkyl sulphates and alkyl ether sulphates of an alkali metal, such as sodium and potassium, of an alkaline-earth metal, for instance, magnesium, of ammonium, of amines and of amino alcohols.

Further, for example, at least one nonionic surfactant may be chosen from polyethoxylated and polypropoxylated fatty alcohols (such as $C_6$-$C_{24}$ alcohols), the number of ethylene oxide and/or propylene oxide groups may range, for example, from 1 to 50 groups; mono- and polyglycerolated fatty alcohols (such as $C_{6}$-$C_{24}$ alcohols) comprising, for example, from 1 to 30 glycerol groups, and polyglycerolated fatty amides (such as $C_{6}$-$C_{24}$ amides) comprising, for example, from 1 to 5 glycerol groups and, further, for example, from 1.5 to 4 glycerol groups.

In one embodiment, the at least one surfactant present in the, at least one hydrogen peroxide oil-in-water emulsion is present in an amount ranging, for example, from 0.05% to 30% by weight, relative to the total weight of the at least one hydrogen peroxide oil-in-water emulsion and, further, for example, from 0.1% to 20% by weight, relative to the total weight of the at least one hydrogen peroxide oil-in-water emulsion.

For example, the ready-to-use composition, i.e. the at least one anhydrous bleaching composition and the at least
one oxidizing composition, may have a total surfactant content ranging, for example, from 0.05% to 30% by weight, relative to the total weight of the ready-to-use composition and, further, for example, from 0.1% to 20% by weight, relative to the total weight of the ready-to-use composition.

Copolymer

The at least one copolymer present in the at least one oxidizing composition comprises at least one unit derived from an ethylenically unsaturated monomer comprising at least one sulphonic group, in free form or partially or totally neutralized form, and comprising at least one hydrophobic portion.

The ethylenically unsaturated monomers comprising at least one sulphonic group can be chosen, for example, from vinylsulphonylic acid, styrenesulphonylic acid, (meth)acrylamido(C1-C22)alkylsulphonic acids, and Na(C1-C22)alkyl (meth)acrylamido(C1-C22)alkylsulphonic acids, for instance, undecylenylamidomethanesulphonic acid, and also partially or totally neutralized forms thereof.

(Meth)acrylamido(C1-C22)alkylsulphonic acids, such as acrylamidomethanesulphonic acid, acrylamidoethanesulphonic acid, acrylamidopropanesulphonic acid, 2-acrylamido-2-methylpropanesulphonic acid, methacrylamido-2-methylpropanesulphonic acid, 2-acrylamido-n-butanesulphonic acid, 2-acrylamido-2,4,4-trimethylpentanesulphonic acid, 2-methacrylamidododecylsulphonic acid and 2-acrylamido-2,6-dimethyl-3-heptanesulphonic acid, and also partially or totally neutralized forms thereof, can, for example, be used. For example, 2-acrylamido-2-methylpropanesulphonic acid (AMPS) and partially or totally neutralized forms thereof can be used.

The total or partial neutralization of the sulphonic functions of the copolymer may, for example, be performed using a mineral base, such as sodium hydroxide, potassium hydroxide or aqueous ammonia; or an organic base, such as mono-, di- or triethanolamine, an aminomethylpropanediol, N-methylglucamine, basic amino acids, for instance, arginine and lysine, and mixtures of these compounds.

The hydrophobic portion of the copolymer can, for example, comprise from 6 to 50 carbon atoms, further, for example, from 6 to 22 carbon atoms, and even further, for example, from 6 to 18 carbon atoms, such as from 12 to 18 carbon atoms.

In one embodiment, the copolymers disclosed herein are crosslinked.

The crosslinking agents may, for example, be chosen from polyolefinically unsaturated compounds commonly used for the crosslinking of polymers obtained by free-radical polymerization. Non-limiting mention may be made, for example, of divinylbenzene, diallyl ethers, dipropylene glycol diallyl ethers, polyglycol diallyl ethers, triethylene glycol divinyl ethers, hydroquinone diallyl ethers, ethylene glycol di(meth)acylates and tetraethylene glycol di(meth)acrylates, trimethylolpropane triacrylate, methylenebisacrylamides, methylenebismethacrylamides, triallylamine, triallyl cyanurate, diallyl maleates, tetraallyl-ethenediamines, tetraallyloxystanines, trimethylolpropane diallyl ethers, allyl (meth)acrylates, allylic ethers of alcohols of the sugar series, and other allyl and vinyl ethers of polyfunctional alcohols, and also allylic esters of phosphonic and vinylphosphonic acid derivatives.

For example, methylenebisacrylamide, allyl methacrylate and trimethylolpropane triacrylate (TMPLA) can be used.

The degree of crosslinking, in the copolymer, may range, for example, from 0.01 mol % to 10 mol % relative to the copolymer and, further, for example, from 0.2 mol % to 2 mol % relative to the copolymer.

In one embodiment, the copolymers, as disclosed herein, have a number-average molecular weight ranging, for example, from 103 g/mol to 2x107 g/mol, further, for example, from 2x103 g/mol to 5x106 g/mol and even further, for example, from 105 g/mol to 15x105 g/mol.

The copolymers, as disclosed herein, may be chosen, for example, from random amphiphilic AMPS polymers modified by reaction with at least one C6-C22 n-monoalkylamine and di-n-alkylamine, such as those described in Patent Application No. WO 00/31154, the description of the polymers and of the synthesis of which forms part of the content of the description.

In one embodiment, the disclosed copolymers may also comprise other ethylenically unsaturated hydrophilic monomers chosen, for example, from (meth)acrylic acids, β-substituted alkyl derivatives thereof and esters thereof obtained with monoalcohols and mono- and polyealkylene glycols, (meth)acrylamides, vinylpyrrolidone, maleic anhydride, and itaconic acid and maleic acid.

For example, the copolymers disclosed herein are chosen from amphiphilic copolymers of AMPS and at least one ethylenically unsaturated hydrophilic monomer comprising at least one hydrophobic portion comprising from 6 to 50 carbon atoms, for example, from 6 to 22 carbon atoms, further, for example, from 6 to 18 carbon atoms and even further, for example, from 12 to 18 carbon atoms.

The disclosed copolymers may also comprise at least one ethylenically unsaturated monomer not comprising a fatty chain, such as (meth)acrylic acids, β-substituted alkyl derivatives thereof and esters thereof obtained with monoalcohols and mono- and polyealkylene glycols, (meth)acrylamides, vinylpyrrolidone, maleic anhydride, and itaconic acid and maleic acid.


"Solution properties of micelle networks formed by non-ionic moieties covalently bound to a polyelectrolyte: salt effects on rheological behavior—Langmuir, 2000, Vol. 16, No. 12, 5324–5332";


The ethylenically unsaturated hydrophilic monomers of the disclosed copolymers are chosen, for example, from acrylates and acrylamides of formula (I) below:
wherein R₁ and R₃, which may be identical or different, are chosen from hydrogen and linear and branched C₁–C₉ alkyl groups (such as methyl); Y is chosen from O and NH; R₂ is chosen from hydrophobic hydrocarbon-based groups comprising from 6 to 50 carbon atoms, for example, from 6 to 22 carbon atoms, further, for example, from 6 to 18 carbon atoms, and even further, for example, from 12 to 18 carbon atoms; x is an integer ranging from 0 to 100.

For example, R₂ is chosen from linear C₆–C₁₈ alkyl groups (for example, n-hexyl, n-octyl, n-decyl, n-hexadecyl and n-dodecyl) and branched and cyclic C₆–C₁₈ alkyl groups (for example, cyclohexadecane (C₉₋₁₀ and adamantane (C₁₀)); C₆–C₁₈ alkylperfluoro groups (for example, groups of formula \(CH₂₋₃CF₂₋₅CF₃\); cholesteryl groups (C₇₇); and cholesteryl ester residues, for instance, cholesteryl oxyhexanate groups; aromatic polycyclic groups, for instance, napthalene and pyrene. Among these groups, R₂ can be chosen, for example, from linear alkyl groups and n-dodecyl groups.

In one embodiment, the monomer of formula (I) comprises at least one alkylene oxide unit (x ≥ 1), such as polyoxyalkylated chains. The polyoxyalkylated chain can comprise, for example, at least one unit chosen from ethylene oxide and propylene oxide units, such as ethylene oxide units. The number of oxyalkylene units present in the polyoxyalkylated chain can range, for example, from 3 to 100 units, further, for example, from 3 to 50 units, and even further, for example, from 7 to 25 units.

Among these copolymers, non-limiting mention may be made of:
crosslinked and noncrosslinked, neutralized and non-neutralized copolymers comprising from 15% to 60% by weight of AMPS units, relative to the total weight of the copolymer, and from 40% to 85% by weight of \(C₆–C₁₀\) alkyl(meth)acrylamide units, relative to the total weight of the copolymer, and from 40% to 85% by weight of \(C₆–C₁₀\) alkyl(meth)acrylate units, relative to the total weight of the copolymer, such as those described in Patent Application No. EP-A-750 899;
terpolymers comprising from 10 mol % to 90 mol % of acrylamide units, relative to the total weight of the copolymer, from 0.1 mol % to 10 mol % of AMPS units, relative to the total weight of the copolymer and from 5 mol % to 80 mol % of n-(C₆–C₁₀)alkylacylamide units, relative to the total weight of the copolymer, such as those described in U.S. Pat. No. 5,089,578;
crosslinked and noncrosslinked copolymers of partially and totally neutralized AMPS and of dodecyl methacrylate and of n-dodecylmethacrylamide, such as those described in the Morishima articles mentioned above.

Further examples include, copolymers comprising of 2-acrylamido-2-methylpropanesulfonic acid (AMPS) units of formula (II) below:

\[
\begin{align*}
\text{R1} & \quad \text{O} \\
\text{CH3} & \quad \text{NH} \quad \text{C} \quad \text{CH2SO2X'}
\end{align*}
\]

wherein X' is a proton chosen from, alkali metal cations, alkaline-earth metal cations and ammonium ions, and of units of formula (III) below:

\[
\begin{align*}
\text{R4} & \quad \text{O} \\
\text{CH3} & \quad \text{C} \quad \text{O} \quad \text{CH2} \quad \text{CH2} \quad \text{O} \quad \text{R4}
\end{align*}
\]

wherein x is an integer ranging from 3 to 100, for example, from 5 to 80, such as from 7 to 25; R₄ is chosen from hydrogen and linear and branched C₁–C₉ alkyl groups (such as methyl) and R₄ is chosen from linear and branched C₁₆–C₂₅ hydrocarbon-based chains, such as C₁₆–C₂₅ alkyls.

Even further examples include copolymers wherein x = 25, R₄ is methyl and R₄ is n-dodecyl; which are described in the Morishima articles mentioned above.

In one embodiment, X⁺ is an ion chosen from sodium and ammonium.

The molar percentage concentration of the units of formula (II) and of the units of formula (III) in the copolymers may vary as a function of the desired cosmetic use and of the desired rheological properties of the formulation. For example, for the most hydrophobic copolymers, the molar proportion of units of formula (I) or (III) ranges from 50.1% to 99.9% by weight, relative to the total weight of the copolymer, for example, from 70% to 95% by weight, relative to the total weight of the copolymer, and further, for example, from 80% to 90% by weight, relative to the total weight of the copolymer.

For example, for the hydrophobic copolymers, the molar proportion of units of formula (I) or (III) ranges from 0.1% to 50% by weight, relative to the total weight of the copolymer, for example, from 5% to 25% by weight, relative to the total weight of the copolymer, and further, for example, from 10% to 20% by weight, relative to the total weight of the copolymer.

The monomer distribution in the copolymers of the invention may be chosen, for example, from alternating, block (including multiblock) and random monomer distributions.

In one embodiment the amphiphilic copolymers, as disclosed herein, may be obtained according to the standard free-radical polymerization processes in the presence of at least one initiator, such as azobisisobutyronitrile (AIBN), azobisdimethylvaleronitrile, AIBA (2,2’ azobis[2-amidinopropane]hydrochloride), organic peroxides, such as diaryl peroxide, benzoyl peroxide, and tert-butyl hydroperoxide, mineral peroxide compounds, such as potassium persulphate and ammonium persulphate, and H₂O₂ optionally in the presence of reducing agents.

For example, the copolymers can be obtained by free-radical polymerization in tert-butanol medium in which they precipitate.

In one embodiment, the reaction may be performed at a temperature ranging from 0 to 150°C, for example, from 10 to 100°C, either at atmospheric pressure or under reduced pressure. It may also be performed under inert atmosphere, such as under nitrogen.

According to the above process, 2-acrylamido-2-methylpropanesulfonic acid and sodium and ammonium salts thereof can, for example, be polymerized with at least one (meth)acrylic acid ester and C₁₀–C₁₈ alcohol oxyethylated with 8 mol of ethylene oxide (8 EO) (Genapol® C-080 from the company Hoechst/Clariant), C₁₁ oxo alcohol oxyethylated with 8 mol of ethylene oxide (Genapol® UD-080 from the company Hoechst/Clariant), C₁₁ oxo alcohol oxy-
ethylenated with 7 mol of ethylene oxide (Genapole® UD-070 from the company Hoechst/Clariant), C_{12}-C_{14} alcohol oxyethylenated with 7 mol of ethylene oxide (Genapole® LA-070 from the company Hoechst/Clariant), C_{12}-C_{14} alcohol oxyethylenated with 9 mol of ethylene oxide (Genapole® LA-090 from the company Hoechst/Clariant), C_{12}-C_{14} alcohol oxyethylenated with 11 mol of ethylene oxide (Genapole® LA-110 from the company Hoechst/Clariant), C_{16}-C_{18} alcohol oxyethylenated with 8 mol of ethylene oxide (Genapole® T-080 from the company Hoechst/Clariant), C_{16}-C_{18} alcohol oxyethylenated with 15 mol of ethylene oxide (Genapole® T-150 from the company Hoechst/Clariant), C_{16}-C_{18} alcohol oxyethylenated with 11 mol of ethylene oxide (Genapole® T-110 from the company Hoechst/Clariant), C_{16}-C_{18} alcohol oxyethylenated with 20 mol of ethylene oxide (Genapole® T-200 from the company Hoechst/Clariant), C_{16}-C_{18} alcohol oxyethylenated with 25 mol of ethylene oxide (Genapole® T-250 from the company Hoechst/Clariant), C_{16}-C_{18} alcohol oxyethylenated with 25 mol of ethylene oxide and C_{16}-C_{18} iso alcohol oxyethylenated with 25 mol of ethylene oxide.

The viscosities (measured at 25°C using a Brookfield viscometer, needle No. 7) of the aqueous 1% solutions range, for example, from 20,000 mPa·s to 100,000 mPa·s and further, for example, from 60,000 mPa·s to 70,000 mPa·s.

In one embodiment, the copolymer is present in an amount ranging from 0.005% to 15% by weight, relative to the total weight of the composition, for example, from 0.05% to 7.5% by weight, relative to the total weight of the composition, and further, for example, from 0.1% to 5% by weight, relative to the total weight of the composition.

Oil Phase of the Emulsion

The oil phase of the emulsion may, for example, comprise at least one fatty alcohol.

As used herein, the term “fatty alcohol” means any saturated or unsaturated, linear or branched fatty alcohol. Among these fatty alcohols, C_{12}-C_{22} alcohols may, for example, be used.

For example, the at least one fatty alcohol may be chosen from lauryl alcohol, cetyl alcohol, stearyl alcohol, oleyl alcohol, behenyl alcohol, linoleyl alcohol, undecylenyl alcohol, palmityl alcohol, linolenyl alcohol, arachidyl alcohol, and erucyl alcohol. Cetyl alcohol may, for example, be used.

In one embodiment, the at least one hydrogen peroxide oil-in-water emulsion, disclosed herein, the at least one fatty alcohol may be present in an amount ranging from about 0.1% to 30% by weight, relative to the total weight of the at least one hydrogen peroxide oil-in-water emulsion, and, further, for example, from about 0.5% to 15% by weight, relative to the total weight of the at least one hydrogen peroxide oil-in-water emulsion.

Additives

The at least one hydrogen peroxide oil-in-water emulsion may also comprise at least one additive that is common in the field, for example, at least one additive chosen from sequestering agents, such as ethylenediaminetetraacetic acid, pentasodium pentetate (CTFA name) and etidronic acid; hydrogen peroxide stabilizers, such as alkali metal (for instance, sodium and potassium) stannate and pyrophosphate salts, and sodium salicylate; colorants, fragrances; antifoams; and cationic and amphoteric substantive polymers, such as those described above.

In one embodiment, the hydrogen peroxide in the at least one hydrogen peroxide oil-in-water emulsion is present in an amount ranging from 1% to 12% by weight as hydrogen peroxide titre, for example, from 2% to 12% by weight as hydrogen peroxide titre, and, further, for example, from 2.7% to 12% by weight as hydrogen peroxide titre.

The hydrogen peroxide in the at least one ready-to-use bleaching composition may be present, for example, in an amount ranging from 1% to 12% by weight as hydrogen peroxide titre, further, for example, from 2% to 9% by weight as hydrogen peroxide titre, and even further, for example, from 2% to 6% by weight as hydrogen peroxide titre.

For example, the pH of the at least one hydrogen peroxide oil-in-water emulsion may range from 1 to 6 and, further, for example, from 2 to 4.

In one embodiment, the acidic pH ensures the stability of the hydrogen peroxide in the at least one hydrogen peroxide oil-in-water emulsion. The acidic pH may be obtained by using at least one acidifying agent, for example, chosen from hydrochloric acid, acetic acid, phosphoric acid, lactic acid, citric acid, salicylic acid and boric acid.

In addition, the pH may be conventionally adjusted, if necessary, by adding at least one basifying agent, for example, chosen from aqueous ammonia, monoethanolamine, diethanolamine, triethanolamine, isopropanolamine, 1,3-diaminopropane, alkaline and ammonium (bicarbonate, organic carbonate, such as guanidine carbonate, and alkali hydroxide, it being possible, obviously, for all these compounds to be taken alone or as a mixture.

In one embodiment, the at least one hydrogen peroxide oil-in-water emulsion is prepared by mixing at room temperature the hydrogen peroxide and the other ingredients of the aqueous phase of the oil-in-water emulsion and then preparing the emulsion by adding the oil phase of the emulsion, at a temperature above room temperature.

In one example of a process for preparing the ready-to-use bleaching composition, as disclosed herein, comprises mixing the at least one anhydrous bleaching composition and the at least one hydrogen peroxide oil-in-water emulsion. This mixing may be performed immediately before applying the product to the fibers to be bleached.

In one embodiment, the at least one anhydrous bleaching composition is mixed with about 0.5 to about 10 equivalents by weight, of the at least one hydrogen peroxide oil-in-water emulsion.

The pH of the ready-to-use composition disclosed herein may range, for example, from 4 to 12, further, for example, from 7 to 11.5 and even further, for example, from 8 to 11.

Further disclosed herein, is a process for bleaching human keratin fibers, such as hair, comprising applying the ready-to-use bleaching composition to the area of the wet or dry human keratin fibers to be bleached, leaving the composition to act for a leave-in time that is sufficient to obtain the desired bleaching result; removing the composition, from the human keratin fibers, by rinsing with water, washing the human keratin fibers with shampoo and then optionally drying the human keratin fibers.

The leave-in time may range, for example, from 1 to 60 minutes and, further, for example, from 30 to 50 minutes.

Further disclosed herein, is a multi-compartment device or “kit” for performing the process for bleaching human keratin fibers.
This device comprises at least two compartments, wherein at least one compartment comprises:

i) at least one anhydrous bleaching composition comprising at least one peroxgenated salt, at least one alkaline agent, and from 15% to 35% by weight of at least one inert organic liquid, and

ii) at least one oxidizing composition in the form of a hydrogen peroxide oil-in-water emulsion comprising at least one surfactant chosen from nonionic and anionic surfactants and at least one copolymer comprising at least one hydrophobic unit and at least one unit derived from at least one ethylenically unsaturated monomer comprising at least one sulfonic group, in free or partially or totally neutralized form.

In one embodiment, the at least one anhydrous bleaching composition is in paste form.

In one embodiment, the at least one oxidizing composition is in the form of a hydrogen peroxide oil-in-water emulsion.

Non-limiting examples of the present invention will now be given.

EXAMPLES

Bleaching Composition A in Anhydrous Paste Form

Composition A below was prepared by mixing together the following compounds:

<table>
<thead>
<tr>
<th>Amount (g %)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Potassium permanganate</td>
</tr>
<tr>
<td>Sodium diphosphate</td>
</tr>
<tr>
<td>Ammonium chloride</td>
</tr>
<tr>
<td>Ammonium sulphate</td>
</tr>
<tr>
<td>EDTA</td>
</tr>
<tr>
<td>Hexamethyldisocyanate/polylene glycol copolymer comprising α and ω stearyl polyethylene end groups sold under the name Novis FX 1100 by the company Servo Delden Weekly crosslinked carboxymethyl potato starch/sodium salt</td>
</tr>
<tr>
<td>Guar gum</td>
</tr>
<tr>
<td>Xanthan gum</td>
</tr>
<tr>
<td>Titanium oxide</td>
</tr>
<tr>
<td>Sodium cetoctearyl sulphate</td>
</tr>
<tr>
<td>Sodium laurel sulphate</td>
</tr>
<tr>
<td>Magnesium stearate</td>
</tr>
<tr>
<td>Ultramarine</td>
</tr>
<tr>
<td>Isopropyl myristate, sold under the name Isopropyl Myristate by the company Cognis</td>
</tr>
<tr>
<td>Fumed silica of hydrophilic nature, sold under the name Aerosil 300 by the company Degussa Huls</td>
</tr>
</tbody>
</table>

Oxidizing Compositions (O/W Emulsions)

The emulsions below were prepared by mixing the following compounds:

<table>
<thead>
<tr>
<th>Amount (g %)</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
</tr>
<tr>
<td>Glycerol</td>
</tr>
<tr>
<td>AMPS polymer (*)</td>
</tr>
<tr>
<td>Tetrasodium pyrophosphate</td>
</tr>
<tr>
<td>Sodium citrate</td>
</tr>
<tr>
<td>Aqueous 50% hydrogen peroxide solution</td>
</tr>
<tr>
<td>85% phosphoric acid</td>
</tr>
<tr>
<td>Water</td>
</tr>
</tbody>
</table>

(*) ** AMPS (80) methacrylic acid of C10-C18 alcohol oxyethylated with 25 mol of ethylene oxide (20%), crosslinked with trimethylpropane triacrylate, as prepared and described in Patent Application No. FR 2 818 543.

Ready-to-use aqueous bleaching compositions

Comp. A/B: 20 g of bleaching composition A+30 g of oxidizing composition B

Comp. A/C: 20 g of bleaching composition A+30 g of oxidizing composition C

Comp. A/D: 20 g of bleaching composition A+30 g of oxidizing composition D

Comp. A/E: 20 g of bleaching composition A+30 g of oxidizing composition E

The compositions were obtained by mixing.

Evaluation of the speed of mixing of the ready-to-use aqueous bleaching compositions

Evaluation of the mixing time in seconds (cf. via a chronometer)

Starting the chronometer when the spatula enters the mixture Stopping the chronometer when the mixtures are smooth and uniform Evaluation by a panel of 5 individuals

<table>
<thead>
<tr>
<th>Evaluation of the mixing time/mean (seconds)</th>
<th>Standard deviation (seconds)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Comp. A/B</td>
<td>73</td>
</tr>
<tr>
<td>Comp. A/C</td>
<td>90</td>
</tr>
<tr>
<td>Comp. A/D</td>
<td>87</td>
</tr>
<tr>
<td>Comp. A/E</td>
<td>92</td>
</tr>
</tbody>
</table>

The mixture of compositions A and B (Comp. A/B), as disclosed herein, was significantly faster to prepare. Furthermore, the ready-to-use bleaching composition Comp. A/B applied easily and quickly. It showed very good adhesion. It did not run outside the areas of hair that it was desired to bleach. Finally, it gave strong and uniform bleaching, while at the same time afforded very good cosmetic properties.

What is claimed is:

1. A composition comprising:

i) at least one anhydrous bleaching composition comprising at least one peroxgenated salt, at least one alkaline agent, and from 15% to 35% by weight of at least one inert organic liquid, and

ii) at least one oxidizing composition comprising at least one surfactant chosen from nonionic and anionic surfactants and
at least one copolymer comprising at least one hydrophobic unit and at least one unit derived from at least one ethylenically unsaturated monomer comprising at least one sulphonic group, in free or partially or totally neutralized form.

2. The composition according to claim 1, wherein the composition is for bleaching human keratin fibers.

3. The composition according to claim 2, wherein the human keratin fibers are hair.

4. The composition, according to claim 2, wherein the composition is obtained by mixing before using it.

5. The composition according to claim 1, wherein the at least one anhydrous bleaching composition is in paste form.

6. The composition according to claim 1, wherein the at least one oxidizing composition is in the form of a hydrogen peroxide oil-in-water emulsion.

7. The composition according to claim 1, wherein the at least one inert organic liquid is chosen from polydeccenes, carboxylic acid monoesters, carboxylic acid polyesters, sugar monoesters of C₆-C₃₀ acids, polyesters of C₆-C₃₀ acids, cyclic esters, cyclic esters, silicone oils, mineral oils and plant oils.

8. The composition according to claim 1, wherein the at least one inert organic liquid is chosen from esters of C₆-C₃₀ acids and of saturated, linear and branched C₃-C₆ monoalcohols.

9. The composition according to claim 1, wherein the at least one peroxynitrogenated salt is chosen from alkali metal persulphates, alkaline-earth metals persulphates, perborates, percarbonates and peroxides.

10. The composition according to claim 9, wherein the at least one peroxynitrogenated salt is chosen from sodium persulphates and potassium persulphates.

11. The composition according to claim 1, wherein the at least one peroxynitrogenated salt is present in the at least one anhydrous bleaching composition in an amount ranging from 10% to 70% by weight, relative to the total weight of the at least one anhydrous bleaching composition.

12. The composition according to claim 11, wherein the at least one peroxynitrogenated salt is present in the at least one anhydrous bleaching composition in an amount ranging from 20% to 60% by weight, relative to the total weight of the at least one anhydrous bleaching composition.

13. The composition according to claim 1, wherein the at least one peroxynitrogenated salt is present in an amount ranging from 5% to 35% by weight, relative to the total weight of the composition.

14. The composition according to claim 13, wherein the at least one peroxynitrogenated salt is present in an amount ranging from 10% to 30% by weight, relative to the total weight of the composition.

15. The composition according to claim 1, wherein the at least one alkaline agent is chosen from urea; ammonium salts; alkali metal silicates, alkaline-earth metal silicates, phosphates and carbonates.

16. The composition according to claim 1, wherein the at least one alkaline agent is present in the at least one anhydrous bleaching composition in an amount ranging from 0.01% to 40% by weight, relative to the total weight of the at least one anhydrous bleaching composition.

17. The composition according to claim 16, wherein the at least one alkaline agent is present in the at least one anhydrous bleaching composition in an amount ranging from 0.1% to 30% by weight, relative to the total weight of the at least one anhydrous bleaching composition.

18. The composition according to claim 1, wherein the at least one alkaline agent is present in an amount ranging from 0.005% to 20% by weight, relative to the total weight of the composition.

19. The composition according to claim 18, wherein the at least one alkaline agent is present in an amount ranging from 0.05% to 15% by weight, relative to the total weight of the composition.

20. The composition according to claim 1, wherein the at least one anhydrous bleaching composition further comprises at least one surfactant chosen from nonionic, anionic, amphoteric, zwitterionic and cationic surfactants.

21. The composition according to claim 1, wherein the at least one anhydrous bleaching composition further comprises at least one water-soluble thickener not comprising a hydrophobic chain.

22. The composition according to claim 21, wherein the at least one water-soluble thickener in the at least one anhydrous bleaching composition is present in an amount ranging from 0.01% to 30% by weight, relative to the total weight of at least one anhydrous bleaching composition.

23. The composition according to claim 1, wherein the at least one anhydrous bleaching composition further comprises at least one amphiphilic polymer comprising at least one hydrophobic chain.

24. The composition according to claim 23, wherein the at least one amphiphilic polymer is different from the at least one copolymer present in the at least one oxidizing composition.

25. The composition according to claim 24, wherein the at least one amphiphilic polymer comprising at least one hydrophobic chain is present in an amount ranging from 0.01% to 30% by weight, relative to the total weight of the composition.

26. The composition according to claim 1, wherein the at least one anhydrous bleaching composition comprises less than 1% by weight of water, relative to the total weight of the at least one anhydrous bleaching composition.

27. The composition according to claim 26, wherein the at least one anhydrous bleaching composition comprises less than 0.5% by weight of water, relative to the total weight of the at least one anhydrous bleaching composition.

28. The composition according to claim 1, wherein the at least one copolymer of the oxidizing composition comprises at least one unit derived from at least one ethylenically unsaturated monomer comprising at least one sulphonic group chosen from vinylsulphonic, styrenesulphonic, (meth)acrylamido(C₅-C₇)alkylsulphonic, and N-(C₅-C₇)alkyl(meth)acrylamido(C₅-C₇)alkylsulphonic acids.

29. The composition according to claim 28, wherein the N-(C₅-C₇)alkyl(meth)acrylamido(C₅-C₇)alkylsulphonic acid is chosen from undecylacrylamidomethanesulphonic acid.

30. The composition according to claim 1, wherein the at least one hydrophobic unit, of the at least one copolymer, comprises from 6 to 50 carbon atoms.

31. The composition according to claim 30, wherein the at least one hydrophobic unit, of the at least one copolymer, comprises from 6 to 22 carbon atoms.

32. The composition according to claim 31, wherein the at least one hydrophobic unit, of the at least one copolymer, comprises from 6 to 18 carbon atoms.

33. The composition according to claim 32, wherein the at least one hydrophobic unit, of the at least one copolymer, comprises from 12 to 18 carbon atoms.
34. The composition according to claim 1, wherein the at least one copolymer is present in an amount ranging from 0.005% to 15% by weight, relative to the total weight of the composition.

35. The composition according to claim 34, wherein the at least one copolymer is present in an amount ranging from 0.05% to 7.5% by weight, relative to the total weight of the composition.

36. The composition according to claim 35, wherein the at least one copolymer is present in an amount ranging from 0.1% to 5% by weight, relative to the total weight of the composition.

37. The composition according to claim 1, wherein the at least one oxidizing composition comprises at least one anionic surfactant chosen from alkyl sulphates, alkyl ether sulphates, alkylamido ether sulphates, alkylarylsulphonates, alkylaryl sulphonates, monoglyceride sulphates, alkyl phosphonates, alkylamide sulphonates, alkylaryl sulphonates, α-olefin sulphonates, paraffin sulphonates, (C₆-C₂₄)alkyl sulphonates, (C₆-C₂₄)alkyl ether sulphonates, (C₆-C₂₄)alkyl ampholyte sulphonates, (C₆-C₂₄)alkyl sulphonates, (C₆-C₂₄)alkyl sulpohalogenates, and (C₆-C₂₄)alkyl glutamates, (C₆-C₂₄)alkylpolyglycoside carboxylic esters, acyl isethionates and N-acyl taurates, fatty acid salts, alkyl D-galactoside uronic acids and their salts, polyoxyalkylated (C₆-C₂₄)alkyl carboxylic acids, polyoxyalkylated, alkylphenols, alpha-diol compounds and alcohol comprising at least one fatty chain, copolymers of ethylene oxide and of propylene oxide, condensates of ethylene oxide and of propylene oxide with fatty alcohols, polyethoxylated fatty amides, monoo- and polyglycerolated fatty alcohols, polyglycerolated fatty amides, oxyethylene fatty acid esters of sorbitan, fatty acid esters of sucrose, fatty acid esters of polyethylene glycol, alkylpolyglycosides, N-alkylglycine derivatives, and amine oxides.

38. The composition according to claim 37, wherein the at least one fatty chain of the alcohol comprising at least one fatty chain comprises from 6 to 24 carbon atoms.

39. The composition according to claim 37, wherein the amine oxides are chosen from (C₁₀-C₄₄)alkylamine oxides and N-acylaminopropylmorpholine oxides.

40. The composition according to claim 38, wherein the at least one surfactant is present in an amount ranging from 0.05% to 30% by weight, relative to the total weight of the composition.

41. The composition according to claim 39, wherein the at least one surfactant is present in an amount ranging from 0.1% to 20% by weight, relative to the total weight of the composition.

42. The composition according to claim 36, wherein the oil phase of the oil-in-water emulsion comprises at least one fatty alcohol.

43. The composition according to claim 6, wherein the hydrogen peroxide in the composition is present in an amount ranging from 1% to 12% as hydrogen peroxide titre.

44. The composition according to claim 43, wherein the hydrogen peroxide in the composition is present in an amount ranging from 2% to 9% as hydrogen peroxide titre.

45. The composition according to claim 44, wherein the hydrogen peroxide in the composition is present in an amount ranging from 2% to 6% as hydrogen peroxide titre.

46. The composition according to claim 1, wherein the pH of the oil-in-water emulsion ranges from 1 to 6.

47. The composition according to claim 46, wherein the pH of the oil-in-water emulsion ranges from 2 to 4.

48. The composition according to claim 1, wherein the pH of the composition ranges from 4 to 12.

49. The composition according to claim 49, wherein the pH of the composition ranges from 7 to 11.

50. The composition according to claim 49, wherein the pH of the composition ranges from 8 to 11.

51. A process for preparing a ready-to-use composition for bleaching human keratin fibers comprising:
i) at least one anhydrous bleaching composition comprising at least one peroxynitrate salt, at least one alkaline agent, and from 15% to 35% by weight of at least one inert organic liquid, and

ii) at least one oxidizing composition comprising at least one surfactant chosen from nonionic and anionic surfactants and at least one copolymer comprising at least one hydrophobic unit and at least one unit derived from at least one ethylenically unsaturated monomer comprising at least one sulphonic group, in free or partially or totally neutralized form.

52. The process according to claim 51, wherein the human keratin fibers are hair.

53. The process, according to claim 51, wherein the process is obtained by mixing before using it.

54. The process according to claim 51, wherein the at least one anhydrous bleaching composition is in paste form.

55. The process according to claim 51, wherein the at least one oxidizing composition is in the form of a hydrogen peroxide oil-in-water emulsion.

56. A process for bleaching human keratin fibers, comprising:

1) applying, to the area of wet or dry human keratin fibers to be bleached, at least one ready-to-use bleaching composition comprising

i) at least one anhydrous bleaching composition comprising at least one peroxynitrate salt, at least one alkaline agent, and from 15% to 35% by weight of at least one inert organic liquid, and

ii) at least one oxidizing composition comprising at least one surfactant chosen from nonionic and anionic surfactants and at least one copolymer comprising at least one hydrophobic unit and at least one unit derived from at least one ethylenically unsaturated monomer comprising at least one sulphonic group, in free or partially or totally neutralized form,

2) leaving the composition to act for a leave-in time that is sufficient to obtain the desired bleaching result;

3) removing the composition from the human keratin fibers by rinsing with water,

4) washing the human keratin fibers with shampoo and optionally drying the human keratin fibers.

57. The process according to claim 56, wherein the human keratin fibers are hair.

58. The process according to claim 56, wherein the at least one anhydrous bleaching composition is in paste form.

59. The process according to claim 56, wherein the at least one oxidizing composition is in the form of a hydrogen peroxide oil-in-water emulsion.
60. The process according to claim 56, wherein the leave-in time ranges from 1 to 60 minutes.

61. The process according to claim 60, wherein the leave-in time ranges from 10 to 50 minutes.

62. A multi-compartment device or “kit” comprising at least two compartments, wherein, at least one compartment comprises:
   i) at least one anhydrous bleaching composition comprising
      at least one peroxygenated salt,
      at least one alkaline agent, and
      from 15% to 35% by weight of at least one inert organic liquid, and
   ii) at least one oxidizing composition comprising
      at least one surfactant chosen from nonionic and anionic surfactants and
      at least one copolymer comprising at least one hydrophobic unit and at least one unit derived from at least one ethylenically unsaturated monomer comprising at least one sulphonic group, in free or partially or totally neutralized form.

63. The kit according to claim 62, wherein the at least one anhydrous bleaching composition is in paste form.

64. The kit according to claim 62, wherein the at least one oxidizing composition is in the form of a hydrogen peroxide oil-in-water emulsion.

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